

Call for informal consultation on the Government's draft Cycling Delivery Plan

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Overall position

This response stems from a research project funded by the UK Research Councils Energy Programme/EPSC, grant EP/J004855/1, led by Frauke Behrendt at the University of Brighton. The project is entitled 'Smart e-bikes: understanding how commuters and communities engage with electrically-assisted cycling.'

Our overall contention is that the Government's Cycling Delivery Plan should make electrically-assisted bikes a priority component of their forthcoming programme, and support their uptake in a number of different ways. These bikes are mentioned under 'Theme 4' with the action 'Initiate an ongoing programme of work to maximise the potential for electrically assisted pedal cycles (EPACs, or 'e-bikes') to enable targeting otherwise hard to reach journeys or audiences' (p15).

Our research results could help develop this programme and we are interested to get involved with the work.

Our results show that electrically-assisted bicycles can increase the appeal of cycling in the UK, and encourage cycling participation by a relatively wide demographic, thereby providing a potential policy mechanism for helping to widen the appeal of cycling in terms of who cycles, not just overall cycling volume. Through a series of trials with employers in Brighton, we have been able to show that the opportunity to borrow an electrically-assisted bicycle generated relatively high levels of interest, and that this interest came from both cyclists and non-cyclists, and from some (though not all) groups which are traditionally underrepresented in conventional cyclist statistics, including women, older age groups, non-white ethnic groups, those who are currently relatively inactive, car owners/users and those living 3-10 miles from work¹.

The remainder of our response comprises:

- A brief definition of electrically-assisted bikes, and a short summary of their environmental and health credentials.

¹ Cairns S, Behrendt F, Raffo D and Harmer C (forthcoming) *Can electrically-assisted bikes widen the appeal of cycling?* (Paper in draft, submitted for journal consideration)

- A summary of some of the results from our research work, suggesting the potential of this type of bike.
- A summary of potential policy measures that could be considered.

A. Definition and background case for electrically-assisted bikes

Electrically-assisted bikes – or ‘pedelecs’ – are those where pedalling is required by the rider but a battery-powered motor provides assistance to the rider, thereby reducing the effort required to pedal². This type of bike varies in design detail (such as the location of the battery, and the method by which the power assistance is provided), but all share the common feature that assistance cuts out when the rider stops pedalling or when the bike exceeds specified speed thresholds as set out by legislation (15mph in the UK; 25kmph in continental Europe). Most enable the rider to choose varying levels of assistance, or to switch off the assistance at will.

Although they are less eco-friendly and require less physical activity than using conventional bikes for the same journeys, the differences are small. Typically, the energy required to drive the bike is relatively low – requiring approximately 10 pence of electricity (at 2013 prices) for 25-40 miles of travel (depending on terrain and the degree of assistance selected), and there are no local emissions from use (given that the bikes are powered by batteries recharged by electricity).

There have also been several studies (Simons et al 2009³; Gojanovic et al 2011⁴) looking at the health impacts of electrically-assisted bikes, including impacts on heart rates and oxygen consumption, through controlled trials (involving participants travelling a fixed route in different ways). In both studies, even when the e-bike was being used on the highest power setting, the human energy used, and the heart rates generated, were sufficient for e-bike use to provide physical activity of at least ‘moderate intensity’. Both studies also noted that, in real life, e-cycling may encourage people to cycle further, or more often, or faster, which may lead to greater health benefits than those suggested by these trials, and both studies also used a perceptual scale to show that participants considered using the e-bikes to be considerably easier than conventional cycling, and therefore potentially more appealing or easier to sustain over time.

In particular, electrically-assisted bikes possess a number of advantages over conventional bikes, which could lead to them being used for a greater range of journeys, or encourage an increase in cycling by certain groups, with direct environmental and/or health gains. For example, they may appeal to those with heavy loads or children to transport; those with high blood pressure or other physical limitations; those who need to travel long distances, up hills or against the wind; those who are older or less fit; or those who need to arrive at their destination without breaking sweat, who dislike vigorous exercise, are incapable of the peak loading on hills or who are otherwise put off by the physical effort of a normal bicycle. They may also have psychological appeal over conventional bikes – as something innovative and hi-tech, and, separately, as something relatively safe (given the back-up of power in a difficult situation).

² In the rest of this response, the term ‘e-bike’ will be used as shorthand for this type of bike, though our response is limited to the type of bike where the rider is required to pedal, and does not relate to other types of ‘e-bike’, where this is not the case.

³ Simons M, Van Es E & Hendriksen I (2009) Electrically assisted cycling: a new mode for meeting physical activity guidelines? *Medicine and Science in Sports and Exercise* 41 (11), pp2097-2102

⁴ Gojanovic B, Welker J, Iglesias K, Daucourt C & Gremion G (2011) Electric bicycles as a new active transportation modality to promote health. *Medicine and Science in Sports and Exercise* 43 (11), pp2204-2210

In other European countries with greater levels of cycling, this type of bike is rapidly becoming mainstream. For example, in The Netherlands, sales of e-bikes equal or exceed those of conventional bikes in value; in Germany, 1 in 10 bikes sold is an e-bike; and there are estimated to be over a million e-bikes in use across Europe, (Go Pedelec! 2013⁵). Various European cities (such as Vienna, Chambéry, Annecy, Nantes, Stuttgart, Zurich and Graz) have dedicated programmes for encouraging e-bike take-up. There are some small scale trials taking place in the UK, often as part of Local Sustainable Transport Fund activities. Transport for London and the Electric Bike Network are undertaking significant activities with e-bikes. However, overall, arguably, the UK is currently falling behind other countries in this area at present. For example, PRESTO (2010) report on Germany's 'Modellregionen Elektromobilität in Deutschland' programme, which was launched in 2009 with support of €115 million, aimed at making Germany a leader in the electric mobility market. Of the eight regions selected for support, four had plans for measures to support electrically-assisted bikes⁶.

B. Initial results from our research study

As background information, the research project which is feeding this response involves an exploratory study of electrically-assisted bikes (referred to here as 'e-bikes') to examine:

- Whether they have the potential to appeal to a wider range of people than conventional cycling
- Whether people who have the opportunity to use an e-bike start cycling, or cycling more than previously.

The project involved both trials with members of the public, and trials conducted through employers. Overall, we have been overwhelmed by the amount of interest we have received, both from people interested in borrowing bikes, and from the press.

Some of the formal research activity has involved working with two major employers in Brighton. In both cases, we have run full staff surveys, asking employees about a range of travel and activity characteristics, and interest in borrowing an e-bike. Those who express an interest were then asked to complete a second survey, which provided more detailed information about the trial, and asks for practical information. Approximately 40% of those who replied to the initial survey were seriously interested in being part of the trial (241 people), and this included both cyclists and non-cyclists, including 48 people who had not cycled in the previous year, and 3 people who could not ride a bike. This represents a very high level of interest when compared with existing levels of cycling by those answering. Only 22% of those interested in taking part were regular cyclists, with the rest either being occasional cyclists, or non-cyclists, and most were not cycling to work. We have had interest from a wide range of people, and, unlike the situation for conventional cycling, there does not appear to be a gender bias in terms of who is interested. Of interest in health terms, 107 of those interested in borrowing bikes self-reported that they were doing less than the recommended amount of physical activity per week (i.e. at least 2.5 hours of at least moderate intensity physical activity per week).

In 2012, 40 employees from the first employer borrowed e-bikes for 6-8 week periods. In 2013, 40 participants from the second employer were loaned bikes for 8 week periods. Full data analysis is currently in progress. However, initial indications are promising. 76% of the trial participants reported that they cycled more during their trial

⁵ Go Pedelec! (2013) *The Go Pedelec! handbook*, www.gopedelec.eu

⁶ PRESTO (2010) PRESTO cycling policy guide. Report funded by the EU's Intelligent Energy – Europe programme.

period (with, for example, one trial participant going from not cycling to cycling 450 miles in 10 weeks). There is some evidence that having an e-bike available would encourage more sustained behaviour change – 73% of those involved in the trials reported that they would cycle to work at least one day a week 'if they had an e-bike available'. Moreover, there is some suggestion that the trial could lead to longer term behaviour changes anyway – at the end of their bike loan, many participants said that they expected to cycle more after the trial compared with pre-trial, some described new plans for cycling to work, and some discussed purchase of an e-bike. All of the trial bikes are fitted with an automated monitoring system developed for the project (SEMS), which measures usage (GPS and assistance). This helps to corroborate survey data and provides objective data about patterns of and volumes of cycling. Initial figures suggest that the trial participants (the vast majority of which did not previously cycle) travelled – over 9,500km during the trial waves⁷.

Conclusion

Cycling is generally a minority activity in the UK, and participation is dominated by certain sub-groups of the population. Various conclusions emerge from our research into assessing whether such bikes might have the potential to increase the appeal of cycling (reported in more detail in papers currently under review).

First, overall levels of interest in participating in the trial were high, with about 40% of those responding to surveys expressing serious interest in trying out an e-bike. Whilst interpretation of this figure requires caution, high levels of enthusiasm and interest in the bicycles were expressed by both trial participants and non-participants throughout the project, and are also reported in e-bike work elsewhere.

Second, when looking at the composition of those who were interested in borrowing bicycles, it appears that, compared with conventional cycling (based data from the on UK National Travel Survey), the e-bikes may help to increase the initial appeal of cycling to non-cyclists, to women, to older age groups, to non-white ethnic groups, to those who are currently relatively inactive, to car owners and users and to those living 3-10 miles from work. However, it is not clear that they help to increase the appeal of cycling to those with fewer educational qualifications, from relatively low income households or for particular household types.

Moreover, the survey results have been corroborated by qualitative data collection, where participants explicitly reported that the e-bike (rather than the opportunity to borrow a bicycle per se) was the attraction, and listed various attributes that made it appealing, including a greater sense of safety and its appeal as an innovative product, as well as the practical benefits offered.

Clearly, there is a wide range of ways in which people could be encouraged or enabled to use an electrically-assisted bicycle – and the details of options offered would determine levels of appeal. For example, bicycle price and the availability of appropriate bicycle storage options (at homes, workplaces and other important destinations) will make a major difference to whether they seem to be a realistic option. However, given the international interest in finding ways of making people even consider cycling as a possible option, the main finding from this research is that electrically-assisted bikes may have the potential to make a real difference to the appeal of cycling in the right circumstances.

Further information about the project is available via the project website:
<http://www.smart-ebikes.co.uk>

⁷ Cairns S, Behrendt F, Raffo D, Harmer C and Kiefer C (forthcoming) *Electrically-assisted bikes: potential impacts on travel behaviour*. (Paper in draft)

C. Potential policy measures for consideration

Our research team is open to discussion around or involvement in the Department for Transport's e-bike programme which forms part of the Cycling Delivery Plan. Our results could form part of an empirical and data-driven approach. The following points represent a preliminary list of potential policy measures, which could merit further investigation:

1. **Convene a specialist working group** on e-bikes, in order to lead activities. For example, this might usefully involve those in Transport for London, the Electric Bike Network, and others who are already very active on this topic (for example those working on relevant research projects such as 'smart e-bikes', or companies, such as Hertz, who have already trialled electric bike rental).
2. **Increase the recommended standard threshold used in the 'Cycle to Work' scheme**, since most good quality e-bikes will cost more than the current £1000 threshold. (Specifically, our understanding is that this would require the Office of Fair Trading to increase the value of the group consumer credit licence that it has issued to cover employers implementing cycle to work schemes, and be accompanied by changes in the recommendations made by those promoting and implementing the 'Cycle to work' scheme for employers. We are aware that employers with their own 'Consumer Credit Licence Category B' can already allow employees to buy bikes of greater value.) Our understanding is that the Cycle to Work Alliance is also keen to have an increase in the current threshold, to enable people to buy a wider range of bicycles.
3. Consider **direct grants to individuals to lower the cost of purchasing of an e-bike**, perhaps as part of a 'model city' approach (see point 5). For example, there are a number of European cities where this has taken place.
4. Consider working with a local authority to **develop an e-bike model city or town**. This might require funding for several related components. For example, from our work in Brighton, it is clear that in a densely populated, hilly environment, there is considerable interest in e-bikes. However, the nature of the urban environment (a lot of terraced housing and flats, no front gardens etc.) means that secure cycle parking is often a key issue. Hence, any grant to promote e-bikes might usefully include complementary funding for secure parking facilities (which could, at least in theory, incorporate charging points too). There are various other European cities which have adopted e-bike promotion policies⁸.

⁸ The information on Chambéry is taken from a presentation by Nicholas Mercat (2013) '2009-2012: four years of e-bike development policies in Chambéry', at Velo City, Vienna, 13th June 2013. We are currently unclear whether employers offered matched funding subsidies to employees or not.

Case study - Chambéry

The French city of Chambéry (with 120,000 inhabitants) has had a €300,000 programme to promote e-bikes, which began in 2009. Key features include:

- Holding events (often through companies) to enable employees to trial e-bikes (50 per year)
- Enabling people to rent e-bikes for a 1-2 week period
- Offering purchase subsidies of €250 (possibly with additional funding from employers).

More than 1000 people have bought e-bikes using the subsidy. In a subsequent survey, 80% said they would not have bought the bike without the subsidy. 85% were former car drivers. Those evaluating the scheme estimate that the programme has resulted in 1.2 million kilometres transferring from car to e-bike per year, at a cost of only €0.05 per km.

Similar programmes have subsequently been developed in Nantes and Annecy.

5. **Support TABS (The Association of Bikeability Schemes CIC) in developing e-cycle training.** We have had some correspondence with TABS, as they are interested in the e-bike cycle training that we have developed as part of our research project⁹. However, it might be valuable to explore whether further support would be helpful, in terms of developing e-cycle training as a standard bikeability training component. (Specialist e-bike cycle training is being developed in other countries – such as the 'Fit for e-bike' training developed in Austria¹⁰.) E-cycle training is of particular value in attracting 'hard to reach' audiences to or back to cycling by increasing their confidence and safety through a combination of e-bike access and training.
6. Consider developing '**e-bike information and test ride centres**'. These could be run in cooperation with local bike shops and the local authority. These centres would work particularly well in combination with grants for e-bike purchase or leasing, since they could provide an accessible interface enabling the public to receive information and to try out e-bikes. Such centres could be of a 'pop-up' variety, touring the country, or of a more permanent nature (for example, using vacant retail space on the high street). Some or all of them could also e-cycle training, for those who wish to gain cycle confidence. 'E-cycling centres' have successfully been used in other European cities such as Stuttgart.
7. Convene a series of specialist seminars for those working on bike design and/or bike hire schemes to **establish and develop best practice on the design of e-bikes for use in public hire schemes**. We are aware that there are a number of development in bike design taking place to make bikes more suited to hire schemes (e.g. integral locks, tracking devices etc.), and separately, that there is considerable development in e-bike design (although this is often more aesthetic than practical). Some integration of the two approaches might be valuable.
8. Consider whether **grants for cycle hire companies** that offer e-bikes would be appropriate. These might be particularly appropriate in rural tourism areas. There is already some evidence emerging from Local Sustainable Transport Fund work

⁹ Behrendt F and Robinson M (2014) *E-cycle training: Electric Bikes Brighton experience*. Technical note

¹⁰ Go Pedelec (2012) Information on pedelecs for municipal decision makers, www.gopedelec.eu/informationSummaryMunicipalDecisionmakers EN, p22.

in the Lake District, and work by Sustrans in the Cairngorms, which suggests that e-bikes have a useful role to play in such areas – not least as they can encourage visitors to trial a new type of travel whilst on holiday, which may lead to changes in habits when they return home – and because they may provide a valuable transport option to the residents of such areas (which, being rural, are typically lacking in transport options).

9. Consider supporting the establishment of **e-bike leasing schemes**, which would enable people to hire e-bikes for longer periods. These could be offered direct to individuals, or via employers, and could operate in a similar way to car leasing schemes. For example, they might include a monthly fee for usage, which includes all maintenance costs, and a replacement bike every few years. One benefit would be that potential users would therefore avoid the upfront costs required for bike purchase, and concerns about battery longevity. There might be particular groups that such schemes could initially focus on. For example, our discussions have suggested particular interest in e-bikes from the police; community health workers; and those responsible for delivering mail or parcels. E-bike leasing schemes are reported to exist in other countries, such as LeaseRad GmbH in Germany¹¹. Leasing may be a key for private uptake but might also support uptake and development in commercial/service areas of value.
10. Consider **tax breaks for employers to provide charging equipment at work**. From our study, we do not think that stand-alone on-street charging points for e-bikes are likely to be the best use of grant money. However, facilities for charging batteries at work, and/or facilities that combine charging opportunities with secure on-street parking may be advantageous (see point 5). We are unclear whether employers would currently be able to claim any tax relief on providing charging equipment – this would require further investigation. (Note – most e-bikes use a charger that plugs into a conventional plug point, and the battery is simply unlocked from the bike, and connected to the charger.)
11. Consider supporting innovation around cargo e-bikes for goods and last-mile delivery to develop sustainable urban logistics while decreasing congestion, air pollution and lost business productivity. This is of particular importance in the light of high growth in online shopping and the related increase in deliveries.

¹¹ Go Pedelec (2012) Information on pedelecs for municipal decision makers, www.gopedelec.eu/informationSummaryMunicipalDecisionmakers EN, p21.